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DEERBRUSH CONTROL BY CATTLE

AN AID TO PINE PLANTATION ESTABLISHMENT

U. S. DEPARTMENT OF AGRICULTURE · FOREST SERVICE · CALIFORNIA REGION

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F O R E W O R D

An estimated 1,844,000 acres* of timber lands within National Forests of California are presently occupied by dense stands of brush. In many timber types, new burns result in further brush encroachment, thus increasing the overall problem. While progress is being made in the rehabilitation of this acreage, the job is tremendous and costly. Land managers must utilize every possible means of furthering this effort, and at reduced costs.

The ingenuity of several of our people in this direction under a specific set of conditions is described herein. District Ranger Glen E. Sindel, Foresthill District, Tahoe National Forest, prepared this material for presentation at the 1962 meeting of the Society of American Foresters.

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DEERBRUSH CONTROL BY CATTLE

AND AID TO PINE PLANTATION ESTABLISHMENT

ABSTRACT: Informal studies and observations since 1938 indicate that cattle grazing can be used effectively to further pine plantation establishment on certain timber sites dominated by deerbrush (Ceanothus integerrimus). Factors influencing the degree of brush control attained without damage to the plantation include animal concentration, season of use, accessibility to grazing animal (travel conditions) and location of salt and water.

THE PROBLEM

Deerbrush is a densely growing deciduous shrub in the buckthorn family (Rhamnaceae). It is also known locally as sweet birch and wild lilac. Depending upon soil type and site exposure, this fast growing shrub may grow to a height of from 4 to 18 feet (Figure 1). If ungrazed, the long slender branches tend to droop to ground level during that period of the year when they are heavily laden with fresh new growth and seed.

Figure 1.

Typical deerbrush plant in bloom

There are three facts about deerbrush which are of primary interest here.

1. Deerbrush is primarily a fire type[1] and has invaded extensive timber land areas in California following fires.

2. The apparent range of this aggressive plant on the west slopes of the Sierra Nevada mountains is roughly the same as the floristic belt occupied by ponderosa pine (Pinus ponderosa).[2]

3. Of greatest importance is the fact that all of the current year's foliage, flowers and seed are highly palatable and nutritious to cattle.

Mature cows (Figure 2) accustomed to deerbrush ranges show a strong preference for this species during the early and mid-summer grazing period.

Figure 2.

Moderate cattle use of 2 year old deerbrush. Poor utilization in vicinity of logs and other debris.

1 and 2 "The Life History of Deerbrush - A Fire Type," by F. P. Cronemiller, Journal of Range Management, Vol. 12, No. 1, pages 21-25, 1959.

These deerbrush facts have been known by California foresters and stockmen for a number of years.

The tree species of primary interest herein needs little introduction. Ponderosa pine has for years been the preferred species for planting throughout most of the Sierra Nevada range, particularly within the elevational zone under discussion here. Past attempts to establish pine plantations on areas denuded by fire have been discouraging in many instances. Any severe competition by an invading brush species may spell failure for the plantation. The early competition may be for available moisture; at a later date, the young pines may be dwarfed and finally overwhelmed by the brush canopy.

EARLY FORAGE EVALUATION STUDIES

The informal studies, on which this report is based, were made possible by a combination of near-ideal circumstances, more coincidental than pre-planned.

Extensive burns in 1910 and 1924 on the Foresthill Ranger District resulted in almost pure deerbrush stands. During the 13 year period 1928-1941, the Tahoe National Forest was the site of a comprehensive study of deerbrush as a forage plant. Palatability and nutritional value tests were conducted jointly by the University of California and the U. S. Forest Service[3] on those areas.

Results of this study, along with others on the adjacent Eldorado and Stanislaus National Forests pointed up several new facts of value to future studies. Results also generated considerable interest in deerbrush among local stockmen.

The cattle weight studies conducted by L. S. Smith and others showed conclusively that deerbrush was both highly palatable and nutritious. Under certain conditions, young fast growing deerbrush may support up to one cow per acre during the summer months.[4] In this instance, calves from good deerbrush range weighed 50 to 100 pounds more than those on adjacent mountain ranges.

Smith's findings also directed attention to the unexplained but important decline in palatability of deerbrush in late September. Failure to recognize this sudden decline of palatability in or near plantations may result in serious damage to young planted pines if livestock are left on the range after the critical date.

[3] Smith, Leland, Office Report, Tahoe National Forest, 1936

[4] Spargo, W. H., Deerbrush Experimental Plot Progress Report, Stanislaus National Forest, 1959.

THE MCKENZIE MILL BURN - 1936

Before the final range evaluation studies were completed under the direction of L. S. Smith, the Foresthill District suffered another 22,000 acre fire--the devastating McKenzie Mill Fire that clean-burned portions of both the 1910 and the 1924 burns. It also destroyed another 100 million board feet of fine timber, and opened up vast new acreages to brush invasion. An immediate effort was made to reforest the better timber sites within the burn. Existing CCC crews were used to seed spot in 1936-37, and direct planting was continued up through 1941.

Final survival on these extensive plantations (and from natural reproduction) was spotty with about 15-20 percent of the area having an acceptable stocking by 1949.

Substantial numbers of cattle were permitted to graze this burned area beginning in 1938. However, permittees were instructed to place salt away from plantations, and livestock were not encouraged to utilize the restocking areas. The ten year review made in 1950 of these original plantations indicated that cattle may have contributed to higher tree survival on some of the deerbrush areas. Records and reports make no mention of any extensive damage by cattle.

THE ELLIOT RANCH PLANTATION - 1950

The first opportunity to test the possible value of cattle as a means of controlling the unwanted deerbrush came with the replanting of the 260 acre Elliot Ranch burn of September 1949. Most of the area had been planted after the original burn in 1936. However, deerbrush had gained dominance, and only a few of the originally planted trees were in evidence at the time of the second fire in 1949. The Elliot Ranch Plantation was re-planted in February, March and April of 1950. Available cow-calf herds were put on this range on June 1, 1950. Cattle were allowed to utilize the new deerbrush sprouts at will, both within and outside the plantation. A salting plan was arranged to encourage cattle to traverse the plantation from central water sources to salt grounds located on the general perimeter of the area. This plan worked moderately well until the calves were removed from the herd in early September. Survival tree counts made prior to the removal of the calves in the first season showed no material damage to the young seedlings despite close cropping of deerbrush sprouts over most of the area. The reduction of sprouts was less on steep slopes and those portions of the burn most distant from water.

Figure 3.

Twelve year old Elliot plantation heavily grazed each summer season.

Note deerbrush growth differential on grazed portion (foreground) and ungrazed fenced control plot (background).

About a week after the calves were shipped, serious top-nipping of some of the planted trees along the creek was noted. Stockmen believed this damage to be due to deer concentrations in the area. Observations in late September, however proved conclusively that the damage was being caused by the cows. Steps were taken to remove all cattle from the range at this time. However, the damage had been done. A thorough inspection of the entire plantation in October 1950 revealed over 90 percent of the trees were damaged. In most cases, the terminal growth had been nipped off and many trees were uprooted.

We have no positive explanation for this late season damage. There was no material change in the outward appearance of the deerbrush sprouts. At first it was suspected that the removal of calves from

the herd was at least a contributing factor. It is now felt that the late season damage is due to the sudden drop in palatability of the deerbrush reported by Smith and others earlier. In all probability, this condition is related to the lesser protein content of the plant at that time of the season. Guilbert and Hart report a 50% decline in crude protein for deerbrush during the period of May to September.[5]

During the second growing season, 1951, an increased number of cattle were placed on the plantation area. The perimeter salting plan was continued, control fences were erected, and a considerable effort was made by the permittees to force the cattle out into the remote areas of the plantation. Herding was done by the permittees on a voluntary basis and was only partially successful as a control measure. Adequate reduction of deerbrush sprouts was generally limited to those areas relatively free of residual dead brush, down logs and other obstacles.

THE BIG RESERVOIR PLANTATION

During the winter 1959-60, some 130 acres of the 1959 Big Reservoir burn were cleared of all residual trees, snags and heavy brush root crowns. The area was planted with 1-0 ponderosa pine stock. Because of the complete clearing in advance of planting, it was decided to fence all cattle out of the plantation the first year and to use these fences to concentrate cattle on the expected deerbrush stand the second year. The disastrous Volcano Fire of August 1960 swept across the new plantation, igniting material piled in windrows. Severe damage by fire made it necessary to replant about 15 percent of the plantation in the spring of 1961. Deerbrush invasion was not critical at that date; hence it was decided to delay heavy grazing until 1962. Cattle were permitted to graze at will on approximately 6 acres of unfenced plantation immediately adjacent to the reservoir. Results observed on the 6 acre plot indicate that exclusion of cattle is not necessary even on freshly cleared areas (Figure 4). No material damage occurred despite the abnormal concentration of cattle on this small area.

This entire plantation, along with others, was opened to grazing by cattle during the June-September 1962 period.

[5] Guilbert, H. R. and Hart, G. H., California Agricultural Extension Service Circular No. 131, 1946

Figure 4.

Thrifty pine tree, one year after planting, on deerbrush dominated plantation open to grazing.

CURRENT LARGE SCALE PLANTATIONS 1961 AND 1962

The devastating 45,000 acre Volcano fire of August 1960 has resulted in an extensive rehabilitation program providing further opportunity to test the effectiveness of cattle as an aid in establishing new pine plantations. Large scale land clearing and planting projects are now in progress on the better timber sites within the huge burn.

In the spring of 1961 some 200 acres were planted in freshly burned brush fields without benefit of clearing. Another 260 acres were dozer-cleared and hand planted. Deerbrush occurs on only about half of the area occupied by the several 1961 plantations. The entire cow herds of three permittees (on this portion of the ranger district) have been concentrated on those plantation areas where deerbrush is predominant. Control of both sprouts and new deerbrush seedlings has been most encouraging on all areas cleared or partially cleared by dozer prior to planting.

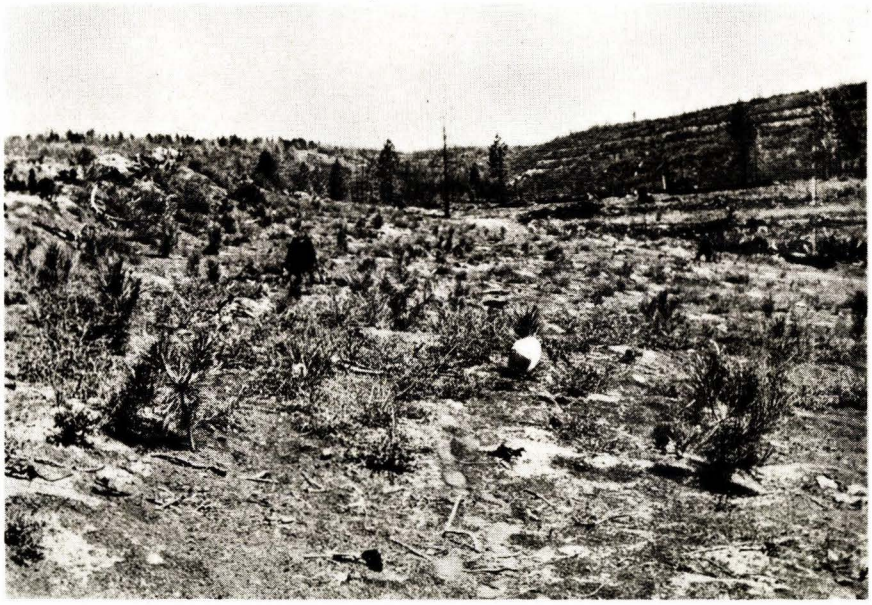

Figure 5.

Excellent deerbrush utilization and control adjacent to water. Note vigor of two year old trees.

New deerbrush growth has been held to an average height of 4 to 6 inches on all but the steepest slopes (Figure 5). Maintaining this degree of grazing pressure on deerbrush prior to and after planting, is essential to plantation success. Unless deerbrush growth and development can be retarded by such grazing use until the trees control the site (8 to 10 years) other measures should be taken initially. Lacking sufficient cattle to provide the necessary use, control of deerbrush should be accomplished with chemicals before planting.

All 1962 plantations have been on lands completely cleared by mechanical means. A total of 1,177 acres were planted this year. Additional livestock watering developments are being installed, where feasible, to encourage concentrations of cattle on those portions of new plantations threatened by deerbrush invasion. Areas subject to invasion by manzanita (Arctostaphylos spp.), whitethorn (Ceanothus cordulatus) and other non-palatable brush species will necessarily require the more expensive chemical treatment prior to planting. The limited selectivity of presently available herbicides does not always permit their application for brush control after planting.

SUMMARY AND CONCLUSIONS

Heavy cattle grazing on fresh burns, where deerbrush is abundant and is the primary brush species, indicate beneficial results to ponderosa pine plantation establishment. Site preparation costs are materially reduced and/or eliminated in some instances. Tree survival and growth are improved and the additional grazing, although on a temporary basis, contributes to the local economy. These and perhaps other undetermined benefits appear substantial and deserve further application and study under appropriate conditions.

For successful application of cattle grazing on pine plantations in fresh burns, the following conditions and considerations are basic:

1. Suitability of area for cattle use--terrain and soil characteristics and condition. Generally confined to slopes under 30% regardless of soil type. It is imperative to regulate grazing use to maintain a stable soil condition.

2. Numerous deerbrush sprouts and seedlings comprise main component of the brush cover--little or no unpalatable species such as manzanita and bear clover (Chamaebatia foliolosa) prevail on the area.

3. Plantations are not within key areas of winter deer range.

4. Sufficient number of cattle are immediately available on a temporary and flexible basis soon after burning to provide needed pressure to suppress deerbrush--numbers may have to be increased or decreased during the grazing season to obtain desired use.

5. Strict regulation of grazing to conform with apparent seasonal preference of cattle for deerbrush in order to avoid tree-cropping damage. Experience indicates June 1 to September 15 to be about the proper season.

6. Adequate and well distributed stock water facilities.

7. Frequent inspection of plantations throughout grazing season to observe general adequacy of the system and need for change (soil condition, species preference, adequacy of grazing pressure on deerbrush, etc.).